

Millimeter Continuum Emission from the Youngest Protostars

S. Terebey

IPAC, JPL and Caltech, IPAC 100-22, Pasadena CA 91125

Abstract. The class O sources form an interesting new category of protostellar objects. Many have strong millimeter continuum emission and exhibit jetlike outflows. There are strong indications that these objects are systematically younger than typical embedded (class I) sources. We are investigating the properties of class O sources to determine whether they are indeed very young, and/or perhaps represent extreme physical conditions, such as rapid rotation.

Continuum emission from thermal dust at millimeter and submillimeter wavelengths provides a powerful tool for determining circumstellar masses and density profiles. However caution is needed in interpreting the results because both the 'envelope' as well as the disk contribute to the continuum emission. Models suggest it should be possible to cleanly distinguish between the infall envelope and protostellar disk components (Terebey, Chandler & André 1993).

We present millimeter interferometer data for several class O objects, focusing on 1,1448 IRS3 and 1.1527. For 1,1448 IRS3 the continuum emission is strong and is resolved on a scale of a few arcseconds (1000 AU). This suggests the bulk of the dust continuum emission originates in an 'infall' envelope rather than a protostellar disk. However for 1.1527, there is evidence for a spatially unresolved component which we interpret as a circumstellar disk. For both sources the C18O line data display a strong velocity gradient which indicates the dense core/envelope is rapidly rotating. We compare our data with the predictions of protostellar collapse models.